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Review of Shellfish Fisheries in Northern British Columbia 1985 and 1986

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Department of Fisheries and Oceans
Prince Rupert, B.C.
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ABSTRACT

Farlinger, S. and G. Thomas 1988. Review of Shellfish Fisheries in Northern British Columbia during 1985 and 1986. Can. MS. Rep. Fish. Aquat. Sci. 1998: 38 p.

This report documents the landings, licencing and management strategies for shellfish fisheries in northern British Columbia (north of Cape Caution) during 1985 and 1986, as well as the history of the fisheries. Annual shellfish landings during 1985 and 1986 were valued at 6.3 and 8.5 million dollars, respectively.

Key words: shellfish fisheries in northern British Columbia, history, management, catches.

RÉSUMÉ

Farlinger, S. et G. Thomas. 1988. Revue des pêches coquillères en Columbie-Britannique pour 1985 et 1986. Can. MS. Rep. Fish. Aquat. Sci. 1998: 38p.

Ce rapport traite des prises débarquées, de l'octroi des permis et des modes de gestion relatifs aux pêches coquillères du nord de la Colombie-Britannique, soit au nord du cap Caution, au cours des années 1985 et 1986. Il fait aussi l'historique des pêches. Les prises débarquées en 1985 et 1986 représentaient les sommes respectives de 6.3 et 8.5 millions de dollars.

Mots-clés: pêches coquillères au nord de la Colombie-Britannique, historique, gestion, quantités pêchées.

INTRODUCTION

This report is the second in a series intended to document the landings, history, management and expansion of shellfish fisheries in northern British Columbia. This report was preceded by Farlinger and Bates, 1985 for all shellfish and by four previous reports for abalone (Bates, 1984, 1985; Sprout, 1983; Federenko and Sprout, 1982). It is hoped that this document will facilitate review and development of management while providing a record of activities in the northern B.C. division.

In order to provide continuity this report covers the period since the most recent publication mentioned above. All landings are given in metric tons or tonnes unless otherwise indicated. Northern B.C. is defined here as the area north of Cape Caution consisting of Statistical Areas 1-10 (Figure 1). Location of Statistical Areas in northern and southern B.C. is shown in Figure 2.

The landed value of shellfish from British Columbia continues to rise; in Northern B.C., this represents an increase in market value for some species, and for others an increase in landings. A minimum value of 3.5 million dollars landed value is estimated for 1985 (Table 1), a 26% increase over the previous year. For 1986 the value rose again to 4.0 million (Table 1). The contribution of individual species to the landings has varied greatly: prawn and geoduck landings have increased; abalone and crab landings are low relative to historical catches. Fisheries established in the south coast of B.C., such as sea urchin, are developing now in the northern waters.

Participation in shellfish fisheries continues to increase both as an additional fishery for salmon fishermen and as employment for new Canadians. In some cases, such as the crab and shrimp trap fisheries, there are many more vessels eligible to fish than do (Table 2). In the abalone and geoduck fishery, limited entry has kept the number of participants low. None of these fisheries are presently area-licenced so that, with only a few exceptions, all vessels may operate in any zone that is open to fishing.

Specific licence characteristics and requirements for each shellfish fishery are described below. The Shellfish Working Group is composed of District and Division representatives from Fisheries Branch as well as members from the Shellfish Section in the Research Branch. Management plans are developed in the preceding fall by the Shellfish Working Group with information which varies widely in quality

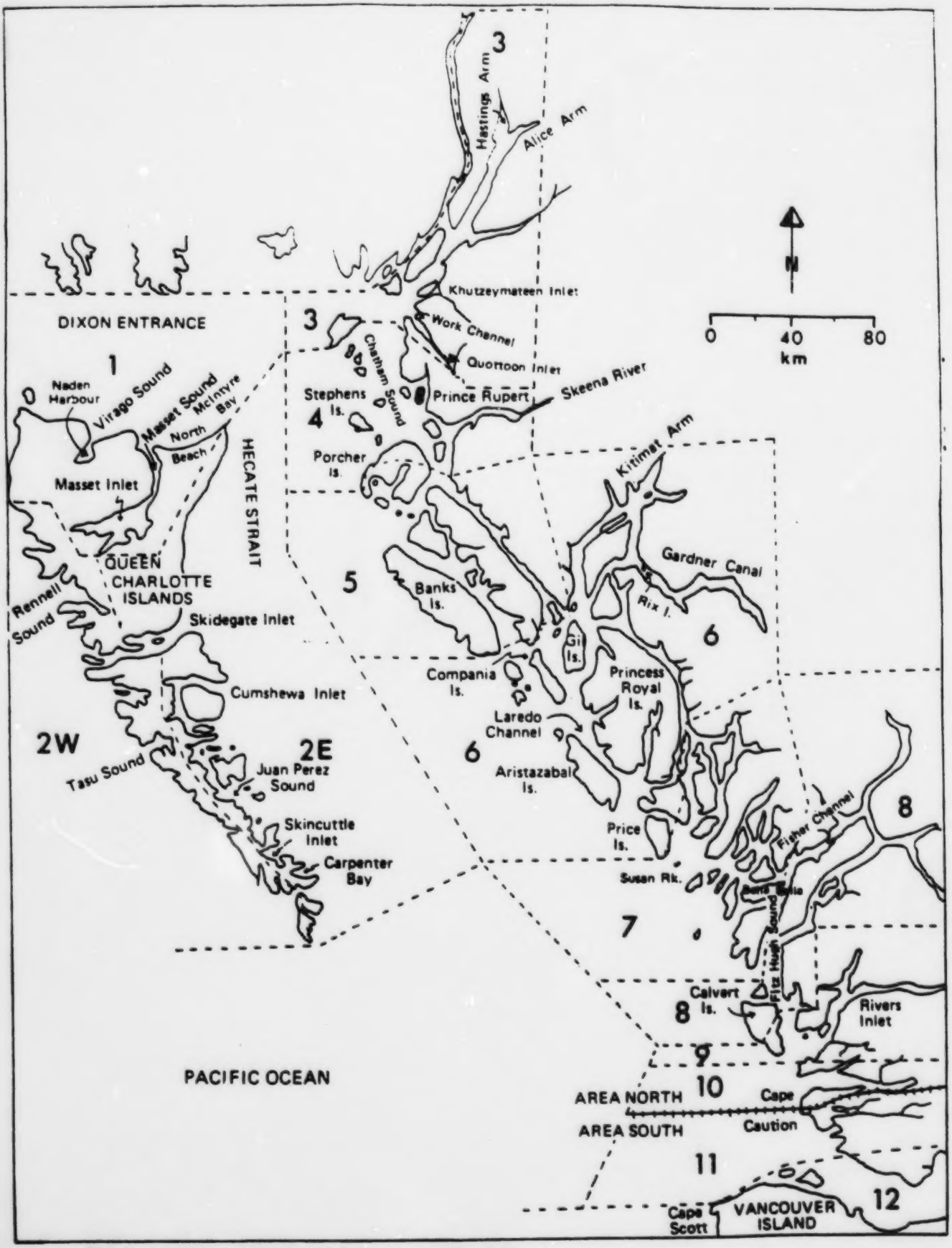

Fig. 1. Location of Statistical Areas in northern B.C.

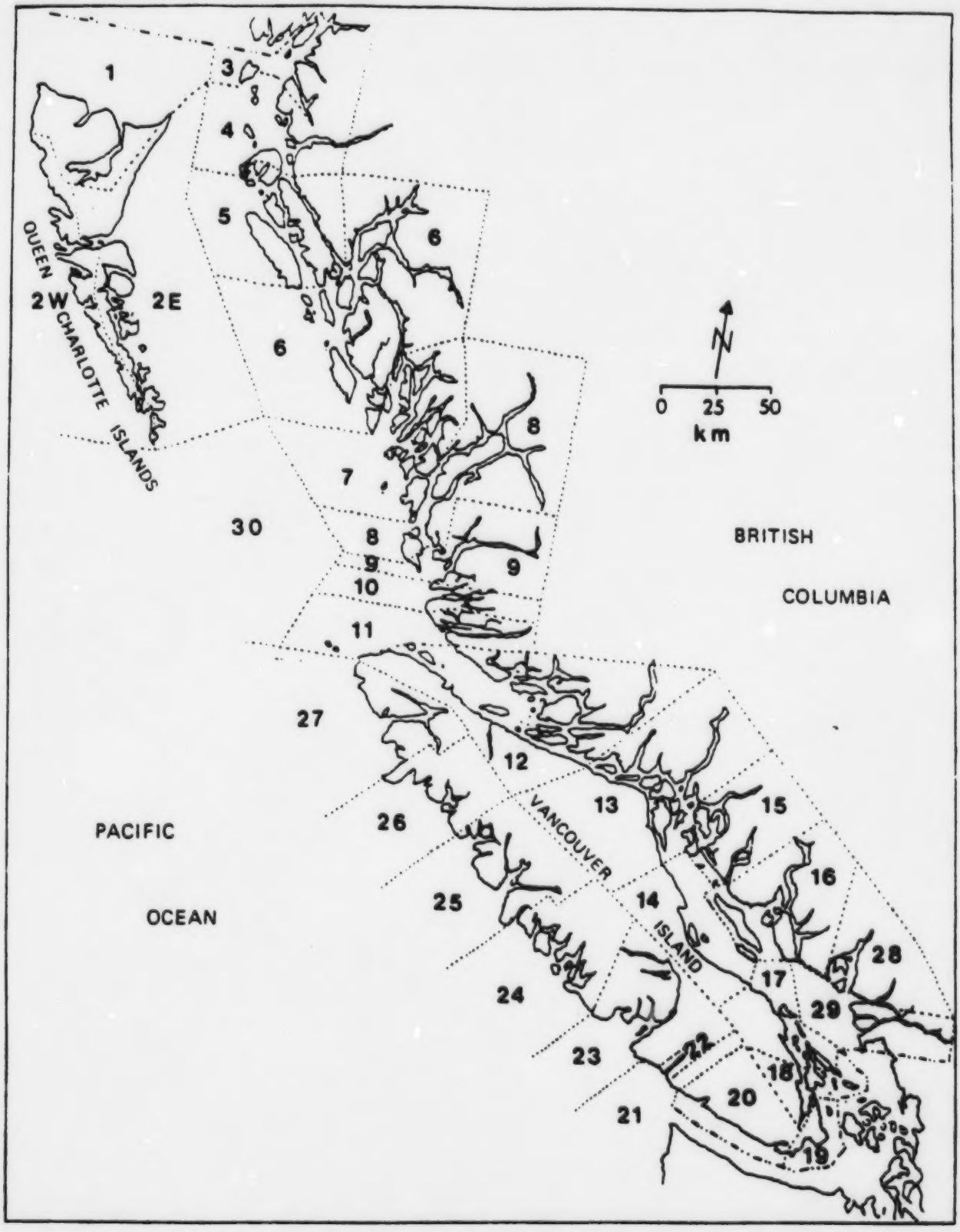

Fig. 2. Location of Statistical Areas in British Columbia.

Table 1. Landings and estimated value of shellfish fisheries in northern B.C., 1985 and 1986.

Species	Annual landings (kg)		% of total landings		$ value (x1000)		$/kg	
	1985	1986	1985	1986	1985	1986	1985	1986
Geoduck	1,436,364	1,692,672	71.8	72.4	1,206.5	1,455.7	$0.84	$0.86
Crab	274,248	251,115	13.7	10.7	1,097.0	1,074.8	$4.00	$4.28
Prawn	99,137	126,586	5.0	5.4	654.3	849.4	$6.60	$6.71
Abalone*	43,778	45,955	2.2	2.0	468.9	654.9	$10.71	$14.25
Razor Clams**	98,678	139,848	4.9	6.0	103.6	124.5	$1.05	$0.89
Shrimp	34,297	49,043	1.7	2.1	85.4	79.0	$2.49	$1.61
Squid	3,223	12,526	0.2	0.5	5.3	20.3	$1.63	$1.62
Octopus	9,219	7,566	0.5	0.3	23.4	19.4	$2.54	$2.57
Sea Urchin	0	11,809	0.0	0.5	0.0	5.8	$0.00	$0.49
Scallop	330	18	0.0	0.0	0.5	0.1	$1.61	$3.13
Total	1,999,274	2,337,138	100.0	100.0	3,644.9	4,283.7	$1.82	$1.83

* Harvest log data. ** Landings supplied by L. Enderud, DFO, Masset.

Table 2. Number of licensed vessels and their utilization in shellfish fisheries in B.C., 1985 and 1986.

Shellfish Species	No. of eligible or issued licences		No. licences with landings		No. licences with Northern B.C. landings		Licence category required
	1985	1986	1985	1986	1985	1986	
Crab	5600+	6497	472	386	54	55	C licence and A, G, K, L, M, S, and T licences
Prawn	544	551	222	227	28	39	Z licence no limited entry
Shrimp	247	249	140	170	17	29	S licence, limited entry
Abalone	26	26	26	19	19	17	E licence, limited entry
Geoduck	55	55	55	55	24	26	G licence, limited entry
Squid	76	61	12	18	3	5	Z licence, no limited entry
Octopus	73+15	91	130	130	33	37	Z licence, with or without vessel, no limited entry, also incidental catch
Scallop	30	25	17	17	1	2	Z licence, no limited entry, also incidental catches
Weathervane	8	1					
Pink & Spiny	22	24					
Sea Urchin		103		67		1	Z licence, no limited entry

among the species. As these fisheries expand, more attention and resources are required for responsible management.

CLAM FISHERY

SPECIES HARVESTED

Harvested species of clam include butter clams (Saxidomus giganteus), native and Japanese littlenecks (Protothaca stamina and Venerupis japanonica) and razor clams (Siliqua patula). Occasionally the cockle clam (Clincardium nuttalli) and the horse clam (Tresus capax) enter the commercial catch.

REGULATIONS

Participation in the clam fishery is highly dependent on weather, success of other fisheries, price offered for the product and employment rate. In addition, all of northern B.C. is closed to bivalve shellfish harvesting, except for razor clams, by an order in council because of the risk of PSP (paralytic shellfish poisoning). However, it is possible to harvest these species provided an adequate sampling program to detect PSP is established before and during harvest, and the clams are delivered to a registered shellfish plant.

A personal commercial fishing licence is required to hand-dig for clams. Size limits are 63 mm for butter clams, 38 mm for littleneck and manila clams and 90 mm for razor clams.

LANDINGS

Catch statistics for clams have been historically poor, with Quayle and Bourne (1972) providing landing data prior to 1970. Until the PSP closure in 1963, northern B.C. contributed 50% to 75% to the recorded catch (razor, butter and littleneck) in British Columbia.

The only sustained clam fishery takes place at North Beach in Area 1 on razor clams. Catch statistics for the razor clam fishery in Area 1 are given in Table 3 (L. Enderud, DFO, pers. comm.). Razor clams have been sold primarily as bait but with the collapse of the Washington State razor clam fishery, Area 1 razor clams were sold as food in 1985 and 1986.

Table 3. Annual landings (kg) of Razor Clams in Statistical Area 1

Year	Landings (kg)
1979	100,747
1980	75,020
1981	16,404
1982	40,835
1983	19,964
1984	102,994
1985	98,605
1986	139,848
Mean	74,302

Note: data from L. Enderud, DFO, Masset

Other species of clam have been harvested periodically north of Cape Caution under permit, but there was no activity in 1985 and 1986 (Table 4).

Table 4. Clam landings in B.C., 1985 and 1986

Stat. Area	Species	Catch(kg) in 1985	% BC Catch 1985	Catch(kg) in 1986	% BC Catch 1986
1	Razor Clam	98,605	3.4	139,848	4.9
2E	Razor Clam	73	0.0		
B.C.	Razor Clam	98,678	3.4	139,848	4.9
B.C.	Butter Clam	252,268	8.6	158,813	5.5
B.C.	J. Littleneck	1,913,511	65.2	1,893,912	65.9
B.C.	N. Littleneck	192,238	6.6	285,009	9.9
B.C.	Mixed	477,905	16.3	396,243	13.8
B.C.	Total	2,934,600	100	2,873,825	100

Note: Area 1 landings supplied by L. Enderud, DFO, Masset.

CRAB FISHERY

SPECIES HARVESTED

The target species of the B.C. crab fishery is mainly Dungeness (Cancer magister), although other species such as the red rock crab (C. productis) and the graceful crab (C. gracilis) are also landed. A very small king crab fishery also exists with only one vessel specifically equipped for this fishery. There have been inquires regarding tanner crab (Chionocoectes sp.); however, since tanner crab is not yet included on the licence schedule, any directed fishery must be conducted under a scientific permit.

REGULATIONS

The primary basis of management of the Dungeness crab fishery is the minimum size limit of 165 mm along with gear regulation, and the time and area closures (Appendix 1). Closures in northern B.C. are based principally on resource sharing concerns, although there are some soft shell closures. Fluctuations in the abundance of Dungeness crab prevent a steady harvest, as reflected by the catch and effort statistics. For the red rock crab fishery, a size limit of 115 mm is in effect. A minimum size limit (181 mm carapace width) has been recommended for the king crab fishery (Jewett, Sloan, and Somerton, in press) as a result of research surveys and concerns expressed by fishermen.

Vessels may fish for crab under a "C" licence (1,102 licences), and also under an "A" licence (4,220 licences), both of which allow harvesting of other fish and shellfish species. Under this system, over 5,000 vessels are eligible to harvest crab, although less than 10% of that number are actually supported by this fishery.

LANDINGS

Butler (in press) reviews the history of the crab fishery in British Columbia. Historically the northern B.C. areas have provided a large proportion of crab landings, with McIntyre Bay the major contributor followed by the Skeena River area. Since the mid-70's, however, the northern B.C. catch and thus also the coastwide catch have fallen dramatically except for a small harvest peak in 1980 (1,698 tonnes coastwide). Total crab landings in the North coast in 1985 totalled 274 tonnes, which was an increase from the 1984 landings of 214 tonnes. In 1985, 54 vessels reported landings; in 1986, 55 vessels reported landings of 318 tonnes.

Table 5. Crab landings (kg) by month and statistical area in northern B.C., 1985

Statistical Area	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	% Total
1	5,488	848	641	1,436	16,714	21,119	8,125	2,320	15,512	75,007	11,852	1,241	160,303	58.5
1*	5,470	4,558	3,010	9,457	17,007	25,002	8,554	2,871	25,355	78,786	15,604	2,947	198,621	72.5
2E	830	-	2	-	115	-	-	-	2,416	1,015	-	1,668	6,046	2.2
2W	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Q.C.I. Total	6,318	848	643	1,436	16,829	21,119	8,125	2,320	17,928	76,022	11,852	2,909	166,349	60.7
													-	-
3	1,345	363	922	1,195	4,195	1,936	3,105	3,209	5,153	8,371	4,278	313	34,385	12.5
4	3,120	1,196	5,497	9,397	1,612	5,161	8,234	2,407	7,536	12,523	5,665	2,853	65,201	23.8
5	84	-	-	39	147	-	68	14	-	-	-	730	1,082	0.4
P.R. Total	4,549	1,559	6,419	10,631	5,954	7,097	11,407	5,630	12,689	20,894	9,943	3,896	100,668	36.7
6	20	9	468	2,509	923	194	4	5	-	-	-	-	4,132	1.5
7	-	-	-	-	-	733	830	237	179	253	-	-	2,232	0.8
8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9	-	-	-	-	-	95	-	137	-	-	-	-	232	0.1
10	-	-	189	161	163	-	-	-	-	-	-	-	513	0.2
C.C. Total	20	9	657	2,670	1,086	1,022	834	379	179	253	-	-	7,109	2.6
N.C. Total	10,887	2,416	7,719	14,737	23,869	29,238	20,366	8,329	30,796	97,169	21,795	6,805	274,126	
% by month	4.0	0.9	2.8	5.4	8.7	10.7	7.4	3.0	11.2	35.4	8.0	2.5		
B.C. Total	48,679	29,947	36,311	98,260	92,425	97,182	220,534	134,824	119,445	175,503	67,592	44,604	1,165,306	

* Data from L. Enderud, DFO, Masset.

Table 6. Crab landings (kg) by month and statistical area in northern B.C., 1986

Statistical Area	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	% Total
1	4,362	2,099	2,757	18,411	19,870	35,603	21,535	5,573	7,442	62,728	21,343	3,852	205,575	65.8
1*	4,113	2,056	2,993	20,593	39,830	53,494	20,781	4,914	11,830	61,122	29,782	8,763	260,271	83.3
2E	-	-	-	-	-	-	-	-	-	7,219	-	-	7,219	2.3
2W	-	-	-	-	-	-	-	-	-	-	2,365	-	2,365	-
Q.C.I. Total	4,362	2,099	2,757	18,411	19,870	35,603	21,535	5,573	7,442	69,947	23,708	3,852	215,159	68.9
3	1,508	1,052	3,128	1,944	735	943	3,097	3,981	670	800	-	-	17,858	5.7
4	664	613	1,000	1,743	2,027	3,845	5,695	2,465	13,014	11,493	10,536	4,681	57,776	18.5
5	-	-	-	-	-	349	4,789	-	4,102	1,065	731	111	11,147	3.6
P.R.D. Total	2,172	1,665	4,128	3,687	2,762	5,137	13,581	6,446	17,786	13,358	11,267	4,792	86,781	27.8
6	-	-	-	-	49	689	41	-	504	2,928	-	2,139	6,350	2.0
7	-	-	-	-	-	390	1,357	1,293	1,215	527	-	-	4,782	1.5
8	-	-	366	254	-	-	-	-	-	-	-	-	620	-
9	-	-	-	-	-	-	377	-	-	-	-	-	377	0.1
10	-	-	-	-	-	287	8	131	-	-	-	-	426	0.1
C.C. Total	-	-	366	254	49	1,366	1,783	1,424	1,719	3,455	-	2,139	10,416	3.3
N.C. Total	6,534	3,764	7,251	22,352	22,681	42,106	36,899	13,443	26,947	86,760	34,975	8,644	312,356	
% by month	2.1	1.2	2.3	7.2	7.3	13.5	11.8	4.3	8.6	27.8	11.2	2.8		
B.C. Total	48,794	40,665	39,650	70,483	78,409	116,249	288,292	117,195	140,987	221,694	94,977	63,946	1,321,341	

* Data from L. Enderud, DFO, Masset.

In 1985 Area 1 (McIntyre Bay and Hecate Strait) and Area 4 (Chatham Sound) supported most of the fishery in the north (58% and 24% respectively of the northern catch). Fishing pressure varied during the year with 35% of the northern catch being taken in October (Table 5). In 1986, 68% of northern landings were reported from Area 1, and 27% from the Skeena (Table 6). From the landings for Area 1, compared to the information collected by the fishery officers, it is estimated that the sales slip data is underestimating catch by at least 25%. Until more information is available, we apply these figures to the entire north coast. Landing estimates for 1985 and 1986 are revised to 343t and 398t respectively.

Sport and native food fisheries also use the crab resource. Major sport fishing areas include Naden harbour in Area 1, Prince Rupert harbour and the surrounding area in Area 4, and Kitimat Arm in Area 6. Native food fisheries also use the above locations, as well as other areas around the 11 coastal villages in northern B.C.

GEODUCK FISHERY

GENERAL

The geoduck (Panope abrupta) fishery in British Columbia began in the southern B.C. waters in 1976 and expanded north of Cape Caution in 1980 (Harbo and Peacock, 1983). The biology of the geoduck is reviewed by Harbo and Peacock (1983).

REGULATIONS

The geoduck fishery is managed by area quotas. Quotas for 1985 and 1986 are as follows:

1985

	Exploratory Fishing	
Areas 1, 2W	650,000 lb	294.8 mt
Area 2E	500,000 lb	226.8 mt
Areas 3, 4, 5, 6	850,000 lb	385.6 mt
Areas 7, 8, 9, 10	2,000,000 lb	907.2 mt
Total North Coast		

1986		
Area 1	250,000 lb	113.4 mt
Area 2E (Cumshewa Inlet, Juan Perez Sound, Skincuttle Inlet)	200,000 lb	90.7 mt
Area 2E (Other)	250,000 lb	113.4 mt
Area 2W (North)	250,000 lb	113.4 mt
Area 2W (South)	400,000 lb	181.4 mt
Area 3	250,000 lb	113.4 mt
Area 4	250,000 lb	113.4 mt
Area 5	350,000 lb	158.8 mt
Area 6	250,000 lb	113.4 mt
Area 7, 8	550,000 lb	249.5 mt
Area 9, 10	250,000 lb	113.4 mt
Total North Coast	3,250,000 lb	1,474.2 mt

Although the total B.C. quota for the northern B.C. waters for 1985 remained at 2,000,000 lb (907 tonnes), the area quotas have been modified. In 1986, northern B.C. area quotas were further subdivided and the overall quota increased to 3,250,000 lb (1,474.2 mt). This strategy was designed to stimulate exploration and to shift effort away from known fishing areas. As exploratory areas are fished, quotas are set based on log book information (Table 7). Thus changes are made in the fishery management plans.

The biology of geoducks is not generally well known, but ageing data has shown that individuals may reach 140 years (Breen and Sheilds, 1983). This longevity requires a conservative approach for harvest. Area quotas are established with reference to the "known beds" of geoduck abundance and an average density; the objective is to set quotas at 1% to 2% of the standing stock.

Because the north coast is remote from shorebased processing plants, three 'P' licences , providing for processing of a vessel's geoduck catch at sea, were issued in 1985. In 1986, five 'P' licences were issued to vessels fishing in the north coast.

A sub-area closure was instituted for Burnaby Narrows in Area 2E during the 1985 season and continued in 1986. This sub-area was closed to commercial fishing as a recreation allocation.

LANDINGS

In 1985, geoduck landings in northern B.C. totalled 1,436,364 kg with 773 fishing days expended (Table 8). In

Table 7. Annual Geoduck quotas (kg) in northern B.C., 1980 - 1986

Year	Statistical Area											
	1	2E	2W	3	4	5	6	7	8	9	10	Total
1980												
1981	181,400		90,700	181,400		158,800		158,800		136,100		1,587,600
1982												907,200
1983		294,800			158,800				453,600			907,200
1984	a	294,800	a		158,800				453,600			907,200
1985	a	294,800	a			226,800			385,600			907,200
1986	113,400	204,100	294,800	113,400	113,400	158,800	113,400	249,500		113,400		1,474,200

a Exploratory area, no quota.

Table 8. Geoduck landings (kg) by month and statistical area in northern B.C., 1985 and 1986

Statistical Area	1985				1986			
	Total Landings	% Total Landings	% Total Quota	No. Days Fished	Total Landings	% Total Landings	% Total Quota	No. Days Fished
1	-	-	-	-	6,901	0	0	11
2E	341,490	24	38	196	254,249	15	17	128
2W	213,537	15	24	133	324,953	19	22	137
Q.C.I. Total	555,027	39	61	329	586,103	35	40	276
3	-	-	-	-	119,473	7	8	83
4	-	-	-	-	125,431	7	9	49
5	290,639	20	32	142	323,309	19	22	166
P.R. Total	290,639	20	32	142	568,213	34	39	298
6	59,607	4	7	26	24,066	1	2	18
7	493,872	34	54	252	391,897	23	27	184
8	37,219	3	4	16	2,070	0	0	4
9	-	-	-	-	103,259	6	7	69
10	-	-	-	-	17,064	1	1	13
C.C. Total	590,698	41	65	294	538,356	32	37	288
1985 Total	1,436,364	100	158	765	1986 Total 1,692,672	100	115	862

Table 9. Annual Geoduck landings by statistical Area in northern B.C., 1980 - 1986

Statistical Area	Geoduck landings (tonnes) by year						
	1980	1981	1982	1983	1984	1985	1986
1	-	-	-	-	-	-	6
2E	31	11	-	-	4	342	254
2W	-	-	-	-	-	214	325
3	-	-	-	-	3	-	120
4	4	-	-	-	-	-	125
5	-	84	-	-	214	291	323
6	-	6	-	-	8	60	24
7	-	370	227	207	109	494	392
8	-	18	-	294	183	37	2
9	28	-	-	-	54	-	103
10	5	20	-	-	-	-	17
North B.C.	68	509	227	501	575	1,438	1,691
W.C. Van. Isl.	35	547	409	570	1,174	1,055	1,107,865
E.C. Van. Isl.	63	1,648	2,498	1,669	1,737	2,879	2,194,294

1986, geoduck catch and effort increased to 1,692,672 kg. and 862 days, respectively. Landings of geoducks since 1981 have shown an expansion of area fished with a large number of boats moving into Areas 2E and 2W for the first time in 1985 (Table 9). 1986 was the first year that all of the areas in the north coast were fished (Table 9). The period of the fishery was reduced from nine months (January to September) in 1985 to eight months (January to August) in 1986 (Tables 10 and 11).

OCTOPUS FISHERY

REGULATIONS

A "Z" licence is required for eligibility to fish octopus (Octopus dolfeini) commercially whether from shore or from a vessel. Octopus fishing regulations prohibit the use of any sharp pointed instrument, any chemicals in the intertidal zone or copper sulphate in all waters.

LANDINGS

Landings of octopus have been reported on the B.C. coast since 1964 (Bernard, 1982 and Farlinger and Bates, 1985). These landings have consisted of incidental octopus catches from trawl operations, longline and troll operations and to a lesser extent from crab and prawn traps as well as catches from directed diving and pot fisheries. The 1985 landings of octopus in northern B.C. totalled 9,219 kg (20,324 lb), with 22% and 21% of the catch taken from Areas 4 and 5 respectively. Of the total northern B.C. catch, 41% were taken by traps, 35% by trawl, 10% by diving and 6% and 8% by longline and troll respectively (Table 12). The 1986 landings of octopus in northern B.C. totalled 7,389 kg (16,293 lb), with 23% and 19% of the catch taken from Areas 2E and 8 respectively. Of the total northern B.C. catch, 40% were taken by trawl, 31% by trap, 16% by diving and 12% and 1% by longline and troll respectively (Table 13).

SCALLOP FISHERY

SPECIES HARVESTED

Three species of scallop are fished in British Columbia: weathervane scallop (Pectin patinopectin), pink scallop (Chlamys rubida) and spiny scallop (Chlamys hastata). In

Table 10. Geoduck landings (kg) by month and statistical area in northern B.C., 1985

Statistical Area	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	% Total
1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2E	-	-	-	-	-	68,543	265,984	6,963	-	-	-	-	341,490	23.8
2W	-	-	-	-	-	-	-	123,929	89,608	-	-	-	213,537	14.9
Q.C.I. Total	-	-	-	-	-	68,543	265,984	130,892	89,608	-	-	-	555,027	38.6
3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5	-	-	-	6,069	284,570	-	-	-	-	-	-	-	290,639	20.2
P.R.D. Total	-	-	-	6,069	284,570	-	-	-	-	-	-	-	290,639	20.2
6	-	-	-	-	59,607	-	-	-	-	-	-	-	59,607	4.1
7	22,223	29,319	39,621	374,383	28,326	-	-	-	-	-	-	-	493,872	34.4
8	-	3,819	19,091	14,309	-	-	-	-	-	-	-	-	37,219	2.6
9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C.C. Total	22,223	33,138	58,712	388,692	87,933	-	-	-	-	-	-	-	590,698	41.1
N.C. Total	22,223	33,138	58,712	394,761	372,503	68,543	265,984	130,892	89,608	-	-	-	1,436,364	
% by month	1.5	2.3	4.1	27.5	25.9	4.8	18.5	9.1	6.2	-	-	-		
B.C. Total	253,874	480,921	544,532	1,079,225	580,237	685,372	807,612	326,222	233,849	242,239	71,999	64,177	5,370,259	

Table 11. Geoduck landings (kg) by month and statistical area in northern B.C., 1986

Statistical Area	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total	% Total
1	-	-	-	-	1,280	4,761	-	860	-	-	-	-	6,901	0.4
2E	-	-	2,078	12,874	102,831	136,466	-	-	-	-	-	-	254,249	13.6
2W	-	-	-	-	36,798	181,913	99,119	7,123	-	-	-	-	324,953	17.4
Q.C.I. Total	-	-	2,078	12,874	140,909	323,140	99,119	7,983	-	-	-	-	586,103	31.4
3	-	-	-	-	100,329	191,144	-	-	-	-	-	-	291,473	15.6
4	-	-	-	125,431	-	-	-	-	-	-	-	-	125,431	6.7
5	-	2,216	70,351	250,742	-	-	-	-	-	-	-	-	323,309	17.3
P.R. Total	-	2,216	70,351	376,173	100,329	191,144	-	-	-	-	-	-	740,213	39.7
6	-	259	23,807	-	-	-	-	-	-	-	-	-	24,066	1.3
7	-	256,981	134,916	-	-	-	-	-	-	-	-	-	391,897	21.0
8	2,070	-	-	-	-	-	-	-	-	-	-	-	2,070	0.1
9	925	-	3,148	28,420	29,992	40,774	-	-	-	-	-	-	103,259	5.5
10	-	-	3,655	-	-	13,409	-	-	-	-	-	-	17,064	0.9
C.C. Total	2,995	257,240	165,526	28,420	29,992	54,183	-	-	-	-	-	-	538,356	28.9
N.C. Total	2,995	259,456	237,955	417,467	271,230	568,467	99,119	7,983	-	-	-	-	1,864,672	
% by month	0.2	13.9	12.8	22.4	14.5	30.5	5.3	0.4	-	-	-	-		
B.C. Total	253,874	480,921	544,532	1,079,225	580,237	685,372	807,612	326,222	233,849	242,239	71,999	64,177	5,370,259	

Table 12. Octopus landings (kg) by statistical area and gear type in northern B.C., 1985

Statistical Area	Gear Type					Total Landings (kg)	% Total Landings
	Diving	Long-line	Other Trap	Troll & Handline	Trawl		
1	39	104	-	15	279	437	4.7
2E	38	406	424	-	296	1,164	12.6
2W	-	-	-	-	-	-	-
3	-	-	592	487	-	1,079	11.7
4	766	49	79	-	1,144	2,038	22.1
5	28	-	501	-	1,392	1,921	20.8
6	55	-	1,135	-	-	1,190	12.9
7	-	-	598	-	-	598	6.5
8	-	178	399	31	86	694	7.5
9	-	46	52	-	-	98	1.1
10	-	-	-	-	-	-	-
North Total	926	783	3,780	533	3,197	9,219	
% Total	10.0	8.5	41.0	5.8	34.7		
B.C. Total	19,659	1,708	6,870	1,210	4,401	33,848	

Table 13. Octopus landings (kg) by statistical area and gear type in northern B.C., 1986

Statistical Area	Gear Type					Total Landings (kg)	% Total Landings
	Diving	Long-line	Other Trap	Troll & Handline	Trawl		
1	-	-	-	-	-	-	-
2E	1,004	690	333	-	139	2,166	23.5
2W	-	-	-	-	6	6	0.1
3	-	-	49	-	-	49	0.5
4	159	12	88	-	1,311	1,570	17.0
5	-	16	58	-	1,028	1,102	12.0
6	20	137	71	52	-	280	3.0
7	-	-	-	-	16	16	0.2
8	-	-	1,258	-	470	1,728	18.7
9	-	-	-	-	-	-	-
10	-	-	472	-	-	472	5.1
North Total	1,183	855	2,329	52	2,970	7,389	
% Total	16.0	11.6	31.5	0.7	40.2		
B.C. Total	39,865	1,633	4,647	1,224	5,523	52,892	

addition, the purple hinged rock scallop (Crassadoma gigantea) is taken in the diving sport fishery.

REGULATIONS

The scallop fishery is licenced under the "Z" licence (category "B") which permits fishing with a dredge or diving. In northern B.C., only the deeper weathervane scallops are fished and so far, this fishery has been experimental. A minimum size limit of 120 mm shell height, measured from the hinge to the ventral margin of the shell, is in the regulation for the weathervane scallop.

LANDINGS

In 1985, 318 kg and 12 kg of weathervane scallops were landed from trawl and diving catches respectively. This was 0.8% of the total B.C. scallop landings (38,037 kg) (Table 14).

Table 14. Scallop landings (kg) by gear type in B.C., 1985 and 1986.

Statistical Area	Gear Type	1985		1986	
		Landings	% of BC Landings	Landings	% of BC Landings
1	Diving	12	0.0	7	0.0
	Trawl	318	0.8		
North	Total	330	0.9	7	0.0
B.C.	Diving	32,214	84.5	66,717	98.7
	Trawl	458	1.2	26	0.0
	Other	5,465	14.3	856	1.3
B.C.	Total	38,137		67,599	

SQUID FISHERY

REGULATIONS

A "Z" licence is required for squid (Loligo opalescens)

by seine and by hook and line.

LANDINGS

There are limited records of inshore squid fisheries on the B.C. coast and the recorded catch is either an incidental catch from the trawl fishery or a directed catch from a limited squid seine fishery. In 1985, landings of squid in the north coast totalled 3,223 kg (7,105 lb) with 91% of the catch taken by seine and 60% of the north coast catch taken from Area 8. The total north coast squid catch was only 3% of the total B.C. squid catch (Table 15).

SHRIMP FISHERY

The shrimp fishery in British Columbia utilizes six species, all members of the family Pandalidae. These shrimp are protandrous hermaphrodites, maturing first as males and then as females, and the management strategy reflects this characteristic. In the shrimp fishery, the target species vary depending upon which of the two licenced gear types, trap or trawl, is used. Since these two fisheries differ considerably, they are described separately below.

SHRIMP FISHERY BY TRAP

SPECIES HARVESTED

The prawn (Pandalus platyceros) is the target species for trap harvesting north of Cape Caution. Prawns are larger and have correspondingly higher value and quality than other shrimp. Humpback or king shrimp (P. hypsinotus) and pink (P. borealis) comprise the major portion of the prawn bycatch. A small P. hypsinotus fishery exists in Areas 1-6, 4-10 and 4-11.

REGULATIONS

The trap fishery is licenced under the "Z" licence (category "H") which includes a log book requirement. Logs are received and processed at the Pacific Biological Station in Nanaimo. As fishermen have historically sold a large portion of their catch over the side, landing records have represented only a fraction of the catch. However, with the shrimp fishery becoming more competitive and markets more formalized, sales slip records presently account for a greater portion of the catch. Since 1983 the log book system has provided a cross check for sales slip records.

Table 15. Squid landings (kg) by statistical area and gear type in northern B.C., 1985 and 1986

Statistical Area	1985				Statistical Area	1986			
	Gear Type	Landings (kg)	% of north	% of B.C.		Gear Type	Landings (kg)	% of north	% of B.C.
1	Trawl	263	8.2	0.2	1	Trawl	1,953	15.6	2.5
2E	Seine	-	-	-	2E	Seine	907	7.2	1.2
2W	Seine	408	12.7	0.4	2W	Seine	-	-	-
4	Trawl	23	0.7	0.0	4	Trawl	127	1.0	0.2
7	Seine	606	18.8	0.5	7	Seine	7,258	57.9	9.2
8	Seine	1,923	59.7	1.7	8	Seine	2,281	18.2	2.9
North Ttl.	Seine	2,937	91.1	2.6	North Ttl.	Seine	10,446	83.4	13.3
	Trawl	286	8.9	0.3		Trawl	2,080	16.6	2.6
	All Gear	3,223				All Gear	12,526		
B.C. Ttl.	All Gear	111,336			B.C. Ttl.	All Gear	78,605		

Table 16. Commercial sampling summary for northern B.C. shrimp trap fishery, 1985

Statistical Area	Location	Date	Spawn Index	Mean Carapace Length (mm)			
				Male	Female	Trans.	Immat.
6	Gardner Canal	May 29	2.67	34.05	47.91	36.22	20.30
			6.86	38.63	49.96	39.44	
			3.33	36.30	47.45	40.52	
			2.30	38.35	48.24	40.01	
3	Work Channel	Aug. 15	1.91	38.06	48.99	46.30	29.45
			1.65	37.62	47.68	41.90	30.00
4	P. Rupert Hbr.	Nov. 20	0.44	31.60	46.50	33.30	26.50
			2.14	34.30	46.30	36.00	

The current management strategy involves the monitoring of commercial catches with the object of maintaining a minimum number of ovigerous females per trap. Until late 1983, sampling of catches in northern B.C. was infrequent. As north coast areas are fished often by only one vessel at a time, sampling effort is limited (Table 16).

Although a size limit of 30 mm carapace length is in current regulation for the shrimp fishery, no restrictions on gear, area or catch are presently in effect. The size limit is currently being waived until such time as a method of enforcement is implemented. In 1985, 544 vessels were licenced in British Columbia to fish shrimp by trap.

LANDINGS

Total catch by traps has risen steadily since the early 1970's when reported landings were less than 100 tonnes (Bernard, 1982). In 1985, 222 licenced vessels reported total landings of 525 tonnes with the northern B.C. catch contributing 103 tonnes (19.5% of B.C. total) from the 28 vessels (Table 17). Most of the northern B.C. catch comes from the Central Coast (Areas 6-10), 74% in 1985 (Table 18) and 66% in 1986 (Table 19). Although the fishery continues year round, 50% of the landings in northern B.C. in 1985 occurred from January to April. An early closure in the south coast displaced fishing activity to the north in 1985. In 1986, the northern landings of 139t comprised 23% of B.C. landings.

Table 17. Annual landings (tonnes) and effort for shrimp trap fishery in B.C., 1981-1986

Year	Northern B.C.		Total B.C.	
	Landings (tonnes)	Boat Days	Landings (tonnes)	Boat Days
1981	116	1,052	358	7,221
1982	71	1,718	281	7,248
1983	120	2,020	359	9,117
1984	92	1,553	398	9,117
1985	103	1,939	525	10,668
1986	139	1,648	582	10,622

Table 18. Shrimp trap and trawl landings (kg) by statistical area in northern B.C., 1985

Statistical Area	Trap		Trawl	
	Landings (kg)	% north landings	Landings (kg)	% north landings
1	850	0.8	2,518	8.3
2E	1,308	1.3	-	-
2W	-	-	-	-
Q.C.I. Total	2,158	2.1	2,518	8.3
3	15,490	15.1	1,939	6.4
4	2,605	2.5	14,293	47.2
5	6,778	6.6	11,520	38.0
P.R.D. Total	24,873	24.2	27,752	91.6
6	15,676	15.3	-	-
7	25,238	24.6	-	-
8	24,615	24.0	-	-
9	6,438	6.3	24	0.1
10	3,603	3.5	-	-
C.C. Total	75,570	73.7	24	0.1
North Ttl.	102,601		30,294	
B.C. Total	525,443		667,057	

Note: Prawns comprised 95% (97,945 kg) of shrimp trap landings.

Table 19. Shrimp trap and trawl landings (kg) by statistical area in northern B.C., 1986

Statistical Area	Trap		Trawl	
	Landings (kg)	% north landings	Landings (kg)	% north landings
1	-	-	-	-
2E	5,470	3.9	-	-
2W	-	-	-	-
Q.C.I. Total	5,470	3.9	-	-
3	26,043	18.8	3,083	8.6
4	9,326	6.7	21,863	60.9
5	6,220	4.5	10,469	29.2
P.R. Total	41,589	30.0	35,415	98.7
6	26,264	18.9	-	-
7	22,613	16.3	-	-
8	21,648	15.6	119	0.3
9	14,060	10.1	345	1.0
10	7,198	5.2	-	-
C.C. Total	91,783	66.1	464	1.3
North B.C. Ttl.	138,842		35,879	
	582,137		735,887	

Note: Prawns comprised 95% (97,945 kg) of shrimp trap landings.

SHRIMP FISHERY BY TRAWL

SPECIES HARVESTED

This fishery targets mainly on side-stripe (Pandalus dispar) and pink shrimp (P. borealis) with both species commonly found over muddy bottom. Prawn and king shrimp are caught in much smaller numbers depending on the substrate type.

REGULATIONS

A fishing licence ("S" licence) is required to trawl for shrimp, and two types of gear are used; the beam trawl and the otter trawl (Butler and Boutillier, 1983). The smaller one-man beam trawl is hauled more slowly than the larger otter trawl and produces correspondingly smaller incidental catches.

There are 247 vessels licenced for shrimp fishery by trawl in British Columbia, but many of these are unused and tied by regulation to other licences. In 1985 and 1986, only 101 vessels reported shrimp trawl landings coastwide, with 10 vessels fishing the north coast in 1985 and 12 vessels in 1986.

LANDINGS

In 1985 and 1986, total reported catch for the shrimp trawl fishery in northern B.C. was 30.3 tonnes and 35.9 tonnes respectively (4.5% and 4.9% of total B.C. catch) (Table 20).

Table 20. Annual landings (tonnes) and effort for shrimp trawl fishery in B.C., 1981-1986

Year	Northern B.C.		Total B.C.	
	Landings (tonnes)	Boat Days	Landings (tonnes)	Boat Days
1981	19	305	582	3,612
1982	25	383	407	4,284
1983	17	419	382	6,714
1984	28	432	366	5,666
1985	30	560	667	5,200
1986	36	724	736	4,494

ABALONE FISHERY

GENERAL

The abalone (Haliotis kamschatkana) fishery in British Columbia has been reviewed in five previous reports (Farlinger and Bates, 1985; Bates, 1984, 1985; Sprout 1983; Federenko and Sprout 1982). Data for this section were obtained from fishermen's harvest logs unless indicated otherwise. Appendix 2 and Appendix Figure 2-1 depict annual commercial abalone landings for the period 1952 to 1986, inclusive.

REGULATIONS AND SURVEYS

As in previous years, 26 "E" licences were issued in 1985 and 1986; the season began on January 15 and closed on December 15. The allowable coastwide catch for 1985 of 47,174 kg (104,000 lb) was a decrease of 11,793 kg (26,000 lb) from 1984 and remained the same in 1986. This decrease was precipitated by survey findings made in the spring of 1984 (Boutillier et al., 1985) which showed a decrease in abalone density in Area 2E. The survey was a commitment made by the DFO to the abalone industry at the 1984 industry meeting, to try to ascertain the extent of the decrease in abalone density seen during the 1983 survey (Boutillier et al., 1984). The allowable coastwide catch in 1985 was distributed equally to each licence so that each was assigned 1,814 kg (4,000 lb). Fishermen were allowed to place up to 4 quotas on one vessel resulting in 26 licences being fished by 15 vessels in 1985 and 19 vessels in 1986 (Appendix 3).

The port sampling program, initiated in 1982 was continued in 1985 and 1986. The average size of abalone per landing from this program has ranged from 108 mm to 114 mm in 1985 and 108 mm to 116 mm in 1986, with an average size of 111 mm for 1985 and 112 mm for 1986 (Appendix 4).

In addition to the commercial fishery, abalone are shore-picked in native food and recreational fisheries which are largely undocumented. Recreational shore-picking and diving are restricted to 12 abalone per person per day and 2 days possession limit, north of Cape Caution. The daily limit was lowered from 24 abalone per person per day in 1984 in response to a decrease in stocks.

LANDINGS

The total allowable catch of 47,174 kg was not achieved by the commercial fisheries in either 1985 or 1986. Of the 26

licences issued, 54% in 1985 and 62% in 1986 fished between 1,814 kg and 1,941 kg which is the maximum allowable catch that includes glaze allowance on frozen abalone (Table 21). Abalone was not landed by one licence holder in 1985 because of mechanical problems. Abalone catch on the B.C. coast totalled 43,777 kg (96,512 lb) in 1985 and was taken by 15 vessels with 31 divers. In 1986, 45,567 kg (100,458 lb) were landed by 19 vessels with 31 divers (Appendix 3 & 5). In 1985 most of the catch was taken in Area 6 (25% of total) and Area 1 (21%), with lesser amounts from Areas 12 (13%) and 2E (10%). In 1986, most of the catch was taken in Area 1 and lesser amounts in Area 5, 6 and 10 (Table 22). Catch per unit effort varied widely between areas in both years (Appendix 6, Appendix Figure 6-1). Annual CPUE (98.8 kg/dd in 1985 and 95.5 kg/dd in 1986) continued to decline from previous years.

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Table 21. Range in abalone landings per licence holder in B.C., 1985 and 1986

Range in landings		1985		1986	
kg	lb (x1000)	No. licence holders	% licence holders	No. licence holders	% licence holders
0 - 454	(0-1)	1	3.8	0	0.0
455 - 907	(1-2)	0	0.0	1	3.8
908 - 1,361	(2-3)	3	11.5	0	0.0
1,362 - 1,814	(3-4)	8	30.8	9	34.6
1,815 - 2,037	(4-4.5)	14	53.8	16	61.5
Total		26		26	

Table 22. Abalone landings (kg) by statistical area (1 - 27) in B.C., 1985 and 1986

Statistical Area	1985			1986		
	Landings (logbook) (kg)	Landings (sales slip) (kg)	% B.C. landings (logbook)	Landings (logbook) (kg)	Landings (sales slip) (kg)	% B.C. landings (logbook)
1	9,368	13,210	21.4	15,320	17,593	33.6
2E	4,409	3,385	10.1	6,453	8,599	14.2
2W	-	-	-	2,115	1,784	4.6
3	3,407	557	7.8	738	734	1.6
4	539	-	1.2	1,815	1,815	4.0
5	3,663	7,017	8.4	3,534	5,122	7.8
6	10,820	7,911	24.7	4,170	3,659	9.2
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	13	13	0.0
10	-	-	-	3,015	3,017	6.6
North Total	32,206	32,080	73.6	37,173	42,336	81.6
11	-	-	-	45	213	0.1
12	5,545	3,827	12.7	8,349	8,978	18.3
20	3,776	4,569	8.6	-	-	-
24	-	1,061	-	-	-	-
25	1,964	590	4.5	-	-	-
27	287	-	0.7	-	-	-
South Total	11,572	10,047	26.4	8,394	9,191	18.4
B.C. Total	43,778	42,127		45,567	51,527	

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Appendix 1. North coast commercial crab closures, 1985 and 1986

1985

Area	Location	Type of Closure	Time
1	McIntyre Bay	Softshell	Annual July 10 to Sept. 30
3-18	Iceberg Bay	Native Food Fishery	Annual year round
4-10	Pr. Rupert Hbr. Porpoise Hbr.	Native Food and Sport Fishery	Annual year round
4-11	Morse Basin Wainwright Basin	Native Food and Sport Fishery	Annual year round
6-1	Kitimat Arm	Sport and Food Fishery	Annual year round
6-2	Hartley Bay	Native Food Fishery	Intended Apr. 30 - Oct. 1
8	Bella Coola	Sport and Food Fishery	Annual year round
9-2,3,4	Johnston, Goose, Allard, and Draney Creek Bay	Sport and Native Food Fishery	Aug. 21 - Dec. 31

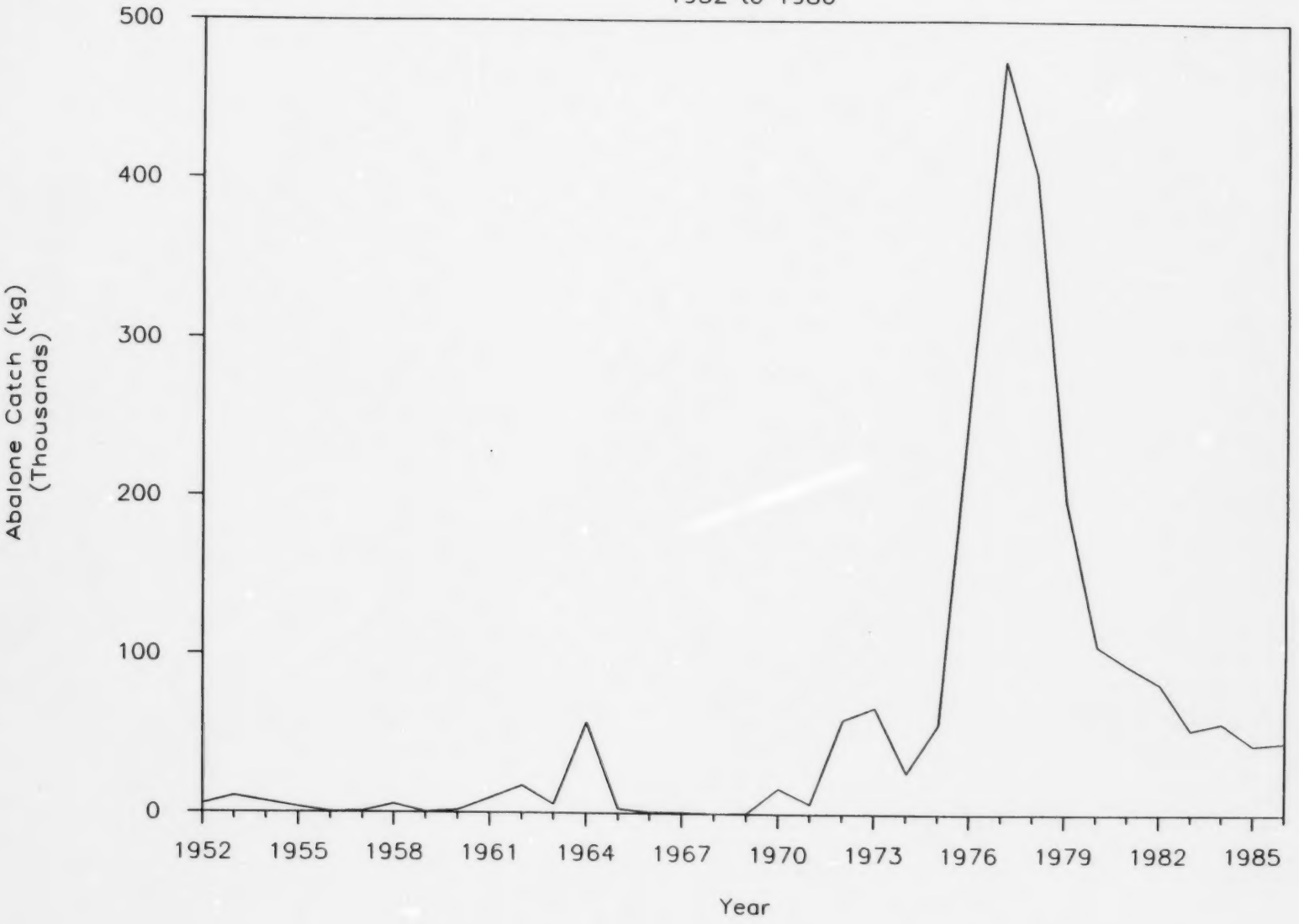
1986

Area	Location	Type of Closure	Time
1-4	Naden Hbr.	Closed to traps, rings only Soft shell	Annual year round May 1 - Sept. 30
1-5	McIntyre Bay	Soft shell	Annual July 10 - Sept. 30
3-18	Iceberg Bay	Native Food Fishery	Annual year round
4-10	Pr. Rupert Hbr. Porpoise Hbr.	Native Food and Sport Fishery	Annual year round
4-11	Morse Basin Wainwright Basin	Native Food and Sport Fishery	Annual year round
6-1	Kitimat Arm	Food and Sport Fishery	Annual year round
6-2	Hartley Bay	Food and Sport Fishery	Intended Apr. 30 - Oct. 1
8	Bella Coola	Food and Sport Fishery	Annual year round
9-2,3,4	Johnston, Goose, Allard, and Draney Creek Bay	Native Food and Sport Fishery	Aug. 21 - Dec. 31

Appendix 2. Annual total abalone landings in B.C., 1952 to 1986

Year	Landings (kg)	Landings (lb)
1952	5,398	11901
1953	10,342	22,800
1954	6,849	15,099
1955	3,538	7,800
1956	499	1,100
1957	953	2,101
1958	5,307	11,700
1959	181	399
1960	1,542	3,400
1961	9,389	20,699
1962	17,554	38,700
1963	5,715	12,599
1964	57,062	125,800
1965	3,084	6,799
1966	726	1,601
1967	862	1,900
1968	91	210
1969	635	1,400
1970	16,239	35,801
1971	6,441	14,200
1972	59,602	131,400
1973	67,132	148,001
1974	26,308	57,999
1975	56,699	125,000
1976	273,062	601,999
1977	474,803	1,046,761
1978	403,998	890,663
1979	197,230	434,818
1980	106,039	233,776
1981	93,651	206,465
1982	82,134	181,074
1983	53,263	117,425
1984	57,514	126,797
1985	43,777	96,512
1986	45,567	100,458
Total	2,193,186	4,835,147

Appendix Fig. 2–1. Annual Abalone Catch



Appendix 3. Mean annual abalone catch per vessel and diver, and fishing effort

Year	1977	1978	1979 Total	1979 Open	1979 Quota	1980	1981	1982	1983	1984	1985	1986
No. Vessels	22	25	25	21	24	25	24	22	22	16	15	19
No. of divers	56	78	59	-	-	33	32	28	28	24	31	31
Mean Catch (kg)												
per vessel	21,582	16,160	8,352	5,190	4,159	4,129	3,902	3,733	2,543	3,579	2,918	2,398
per diver	8,479	5,180	3,539	-	-	3,128	2,927	2,933	1,998	2,386	1,412	1,470
No. of diver days per vessel												
Mean	109	86	54	31	29	32	29	27	21	30	30	25
Range	3-327	8-204	-	8-54	16-48	13-73	12-58	10-78	10-55	6-71	12-56	4-75
per diver												
Mean	43	28	23	-	-	25	22	22	16	20	14	14
Range	1-100	1-69	1-67	-	-	6-58	1-52	2-54	1-55	3-49	1-40	2-44
Catch per diver day												
Mean (kg/day)	199	187	155	-	-	131	142	136	124	118	100	96
Range of mean catch per diver day												
per vessel	72-340	49-354	-	49-585	62-282	70-349	67-325	58-301	34-634	14-195	22-189	49-182
per diver	32-763	5-385	23-278	-	-	40-349	35-287	28-301	34-634	14-195	18-189	17-181

Appendix 4. Annual abalone port sampling summary, Prince Rupert, B.C., 1985 and 1986

Date	Statistical Area	Sample Size	Mean Length (mm)	Standard Deviation	% Legal Size
1985					
Apr. 22	1	65	112.5	9.8	100
Dec. 7	3	65	107.9	5.4	99
Feb. 18	5	40	114.3	8.1	98
Nov. 14	6	100	112.7	7.7	99
Nov. 12	8	50	109.3	6.8	97
Nov. 18	8	105	108.3	6.3	99
1986					
Feb. 6	1	149	116.3	9.0	100
Oct. 27	1	100	108.4	4.8	100
Nov. 14	1	50	114.6	6.9	100
Aug. 27	3	103	110.7	6.9	100
Aug. 18	3	101	108.9	6.7	99
May 12	6	100	110.4	12.2	99
Aug. 13	6	105	114.8	8.8	100
Sep. 29	6	121	108.5	6.4	96

Appendix 5. Annual abalone landings (kg) (from logbooks) by statistical area in B.C., 1977 to 1986

Statistical Area	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	Total
1	45,668	12,888	2,613	3,169	1,923	13,024	12,113	14,442	9,368	15,320	130,528
2E	251,669	102,431	29,528	12,538	21,321	13,539	17,935	12,670	4,409	6,453	472,493
2W	13,174	13,362	5,726	3,724	6,047	161	0	938	0	2,115	45,247
Q.C.I. Total	310,511	128,681	37,867	19,431	29,291	26,724	30,048	28,050	13,777	23,888	648,268
3	10,186	254	0	2,143	0	1,667	0	3,181	3,407	738	21,576
4	0	6,388	2,928	2,692	5,186	1,383	875	236	539	1,815	22,042
5	94,586	88,289	40,408	13,483	2,858	2,201	3,970	4,990	3,663	3,534	257,982
P.R. Total	104,772	94,931	43,336	18,318	8,044	5,251	4,845	8,407	7,609	6,087	301,600
6	33,751	160,269	87,000	44,519	37,756	27,058	7,538	9,899	10,820	4,170	422,780
7	5,601	10,922	2,704	1,943	1,778	898	552	0	0	0	24,398
8	0	0	0	245	0	0	145	0	0	0	390
9	0	0	0	0	553	0	0	0	0	13	566
10	0	0	0	0	0	1,124	0	0	0	3,015	4,139
C.C. Total	39,352	171,191	89,704	46,707	40,087	29,080	8,235	9,899	10,820	7,198	452,273
11	186	0	5,548	1,001	1,828	3,541	0	0	0	45	12,149
12	9,135	459	17,312	14,047	9,595	5,052	2,452	3,270	5,545	8,349	75,216
20	1,430	3,026	924	2,004	4,805	8,604	7,684	6,593	3,776	0	38,846
23	0	0	0	0	0	1,000	0	0	0	0	1,000
24	180	0	0	0	0	18	0	0	0	0	198
25	4,554	5,718	577	0	0	0	0	389	1,964	0	13,202
26	2,332	0	209	0	0	0	0	0	0	0	2,541
27	2,361	0	1,756	0	0	2,866	0	907	287	0	8,177
S.C. Total	20,178	9,203	26,326	17,052	16,228	21,081	10,136	11,159	11,572	8,394	151,329
Unknown	0	0	0	4,507	0	0	0	0	0	0	4,507
B.C. Total	474,813	404,006	197,233	106,015	93,650	82,136	53,264	57,515	43,778	45,567	1,557,977

Appendix 6. Annual abalone fishing effort by statistical area (from harvest logs) in B.C., 1977 to 1986

Statistical Area	1977		1978		1979		1980		1981	
	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)
1	211	216.4	59	218.4	20	130.7	21	152.2	5	384.6
2E	1111	226.5	547	187.3	134	220.4	48	261.2	126	169.2
2W	75	175.7	80	167.0	63	90.9	21	177.3	34	177.9
QCI Total	1322	222.3	606	187.6	154	174.5	69	216.2	131	177.5
3	51	199.7	5	50.7	0	0.0	14	153.1	0	0.0
4	0	0.0	30	212.9	40	73.2	16	168.3	47	110.3
5	470	201.3	506	174.5	347	116.5	104	129.6	28	102.1
P.R. Total	521	201.1	541	175.5	387	112.0	134	136.7	75	107.3
6	251	134.5	761	210.6	449	198.2	381	116.9	264	143.0
7	51	109.8	101	108.1	27	100.1	32	60.7	24	74.1
8	0	0.0	0	0.0	0	0.0	2	122.5	0	0.0
9	0	0.0	0	0.0	0	0.0	0	0.0	3	184.5
10	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
C.C. Total	302	130.3	862	198.6	476	188.5	415	112.5	291	137.8
11	11	16.9	0	0.0	42	132.1	6	166.8	15	121.9
12	95	96.2	6	76.5	126	137.4	130	108.1	92	104.3
20	16	89.4	33	91.7	11	84.0	19	105.1	63	76.3
23	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
24	4	44.9	0	0.0	0	0.0	0	0.0	0	0.0
25	16	284.6	34	168.2	4	144.1	0	0.0	0	0.0
26	14	166.6	0	0.0	3	69.6	0	0.0	0	0.0
27	11	214.8	0	0.0	13	135.1	0	0.0	0	0.0
S.C. Total	167	120.8	73	126.1	199	132.3	155	110.0	170	95.5
Total	2312		2082		1216		773		667	
Mean (a)		198.9		186.9		154.2	+23	127.9	(b)	133.6

(a) Total catch/area/total diver days

(b) 4,507 kg of unknown fishing effort; CPUE based on remaining catch

Appendix 6. Continued

Statistical Area	1982		1983		1984		1985		1986	
	Total diver days	CPUE (kd/dd)	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)	Total diver days	CPUE (kg/dd)
1	48	271.3	62	195.4	104	136.5	78	120.1	147	104.2
2E	116	116.7	119	150.7	89	142.4	31	142.2	56	115.2
2W	1	161.0	0	0.0	16	58.6	0	0.0	18	117.5
QCI Total	164	162.0	181	166.0	193	134.2	109	126.4	203	88.1
3	13	128.2	0	0.0	30	106.0	30	113.6	11	67.1
4	14	98.8	13	67.3	4	59.0	9	59.9	20	90.8
5	33	66.7	35	113.4	49	101.8	35	104.7	34	103.9
P.R. Total	60	87.5	48	100.9	83	101.3	74	102.8	65	93.6
6	186	145.5	70	107.7	69	143.5	90	120.2	48	86.9
7	5	179.6	7	78.9	0	0.0	0	0.0	0	0.0
8	0	0.0	4	36.3	0	0.0	0	0.0	0	0.0
9	0	0.0	0	0.0	0	0.0	0	0.0	1	13.0
10	11	102.1	0	0.0	0	0.0	0	0.0	30	100.5
C.C. Total	202	144.0	81	101.7	69	143.5	90	120.2	79	91.1
11	19	186.4	0	0.0	0	0.0	0	0.0	1	45.0
12	58	87.1	26	94.3	35	93.4	82	67.6	111	75.2
20	71	121.2	91	84.4	78	84.5	66	57.2	0	0.0
23	7	142.9	0	0.0	0	0.0	0	0.0	0	0.0
24	1	17.5	0	0.0	0	0.0	0	0.0	0	0.0
25	0	0.0	0	0.0	3	129.6	19	103.4	0	0.0
26	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
27	19	150.8	0	0.0	8	113.3	3	95.7	0	0.0
S.C. Total	175	120.5	117	86.6	124	90.0	170	68.1	112	74.9
Total	601		427		469		443		459	
Mean (a)		136.4		124.7		118.6		98.8		95.5

(a) Total catch/area/total diver days

(b) 4,507 kg of unknown fishing effort; CPUE based on remaining catch

Appendix Fig. 6–1. Annual Abalone CPUE